



How Many Seasons are There?

Year level 5

Curriculum Links

History

- The nature of a convict or colonial settlement in Australia, including the factors that influenced patterns of settlement, aspects of the daily life of its different inhabitants, and how they changed the environment (Yr 5, ACHHK094)
- Identify points of view in the past and present (Yr 5, ACHHS104)
- Use a range of communication forms (oral, graphic, written) and digital technologies (Yr 5, ACHHS106)

Mathematics

- (optional) Describe and interpret different data sets in context (Yr 5, ACMSP120)

Cross-Curriculum Priorities

- Aboriginal and Torres Strait Islander histories and cultures

Resources

- One or two current calendars that show the solstices and equinoxes
- Copies of students' draft seasonal cycles
- Computer or devices with internet access
- (optional) Climate data sets for your area, either from the Bureau of Meteorology at www.bom.gov.au/climate or weather observations from garden classes

Location

The classroom or outdoors

Duration:

20–45 minutes,
 depending on whether or not
 you complete the extension

Getting started

- Remind students of the Indigenous Seasons lesson. When we started, we said that the annual four-season convention came from Northern Europe.
- Ask students: How did this idea come to Australia?
- Would everyone in Australia agree with this idea? What about the traditional inhabitants of the land? When the first European explorers arrived, did they have the same opinion about seasons in Australia? Why or why not?

Solstices and equinoxes in context

- When European explorers came to, and began settling, Australia, the European world was in the middle of a period of enthusiasm for scientific discovery, known as the Age of Enlightenment or the Age of Reason.
- The enthusiasm for astronomy was strong. Astronomical observations were not only providing data about the movement of the planets but also contributing to navigation. Explorers had to be astronomers too, and the purpose of many expeditions was to make astronomical observations.
- The seasons are formed by the relative position of the Earth and the sun. This video shows the orbit of the Earth around the sun and how the seasons are created: www.youtube.com/watch?v=q4_-R1vnJyw
- While Europeans were making more and more accurate observations of the movement of the planets, certain key dates in the year had been observed for centuries, even millennia.
- These key dates are the shortest day of the year, the longest day of the year and the days in which day and night are equal in length. The shortest day is the winter solstice, the longest is the summer solstice, and the two equal days are the equinoxes.
- Further detail about solstices and equinoxes is provided on the next page.

Teachers' note

You can easily print calendars from the Time and Date website at www.timeanddate.com/calendar (choose Australia in the 'Country' drop-down menu at the top and, at the bottom, select 'All holidays/observances/religious events' from the drop-down menu to see a list of festivals and the equinox/solstice dates).



Solstices and equinoxes

The Earth orbits the sun. Its orbit is not a perfect circle but is slightly elliptical (oval-shaped).

The equinoxes are the two dates when the sun crosses the plane of the Earth's equator, meaning on these days the Earth experiences equal hours of daylight and night. The equinoxes occur around 21 March and 22 September each year.

The solstices are the shortest and longest days of the year. These dates occur around 21 June and 22 December each year.

These dates have been incredibly important to many civilisations throughout human history because these observable phenomena are used to track the cycles of the year (Stonehenge is a well-known example of this).

Astronomers define the seasons by dividing the year into four equal parts, defined by the equinoxes and solstices. This is a tidy system for astronomy, but it doesn't match the weather data for most of Australia. Even in locations with four clear seasons in a year, the hottest and coldest weather lags a few weeks after the summer and winter solstices. Dates on calendars mark these 'official' first days of spring, summer, autumn and winter, but they are astronomical definitions rather than earth-based climatic or weather observations.

Solstices and equinoxes

- Students use a current calendar to identify the dates of this year's solstices and equinoxes (they can change slightly from year to year).
- On their seasonal cycle, each student marks the solstices and equinoxes.
- Discuss: An astronomer would tell us that the seasons should fit neatly around these dates. Looking at their cycles, students count how many months each astronomical season would last (three).
- Organise the class into small groups.
- In groups, students use their cycles to answer this question:
 - Does our experience support or contradict the notion that there are four seasons of exactly three months in every year? Relate your response to evidence on your seasonal dials.
- Give the groups five minutes to prepare a response. A spokesperson from each group presents their response, including three pieces of data from their seasonal cycles that provide support for their response.

Extensions

- Provide each group with climate data for your area. There are data sets on the Bureau of Meteorology site at www.bom.gov.au/climate under 'weather and climate data', or if you have weekly observations from your garden classes they would be ideal.
- Ask students to decide how to plot the data onto their cycles (or onto a new cycle if they request one). In their response to the above question, students use the weather data to support their argument.